

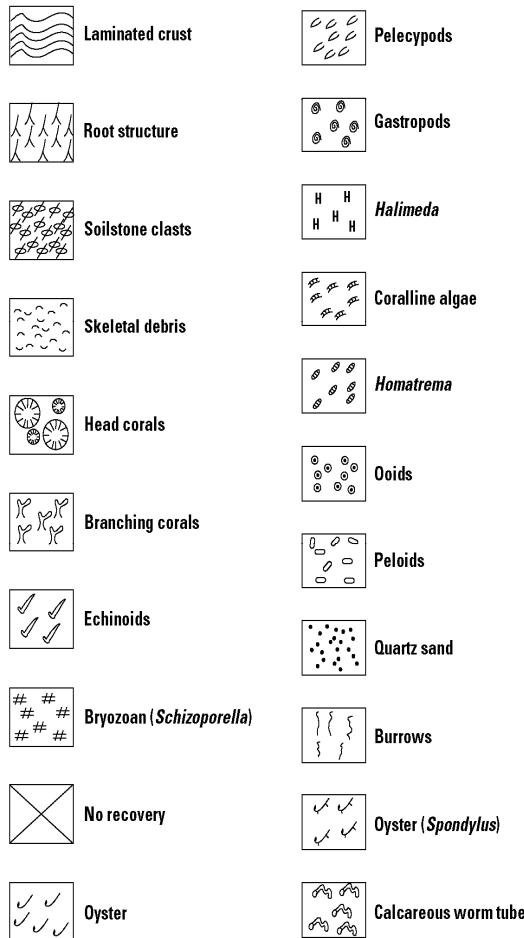
Appendix C

Lithologic Well Logs

Classification of Carbonate Rocks According to Depositional Texture (after Dunham, 1962)

DEPOSITIONAL TEXTURE RECOGNIZABLE				DEPOSITIONAL TEXTURE NOT RECOGNIZABLE
Original Components not Bound Together During Deposition				Crystalline Carbonate (Subdivide according to classifications designed to bear on physical texture or diagenesis.)
Contains mud (particles of clay and fine silt size)		Lacks mud and is grain-supported		
Mud-supported	Grain-supported			
Less than 10 percent grains	More than 10 percent grains	Packstone	Grainstone	Original components were bound together during deposition... as shown by intergrown skeletal matter, lamination contrary to gravity or sediment-filled cavities that are roofed over by organic matter and are too large to be interstices.
Mudstone	Wackestone			Boundstone

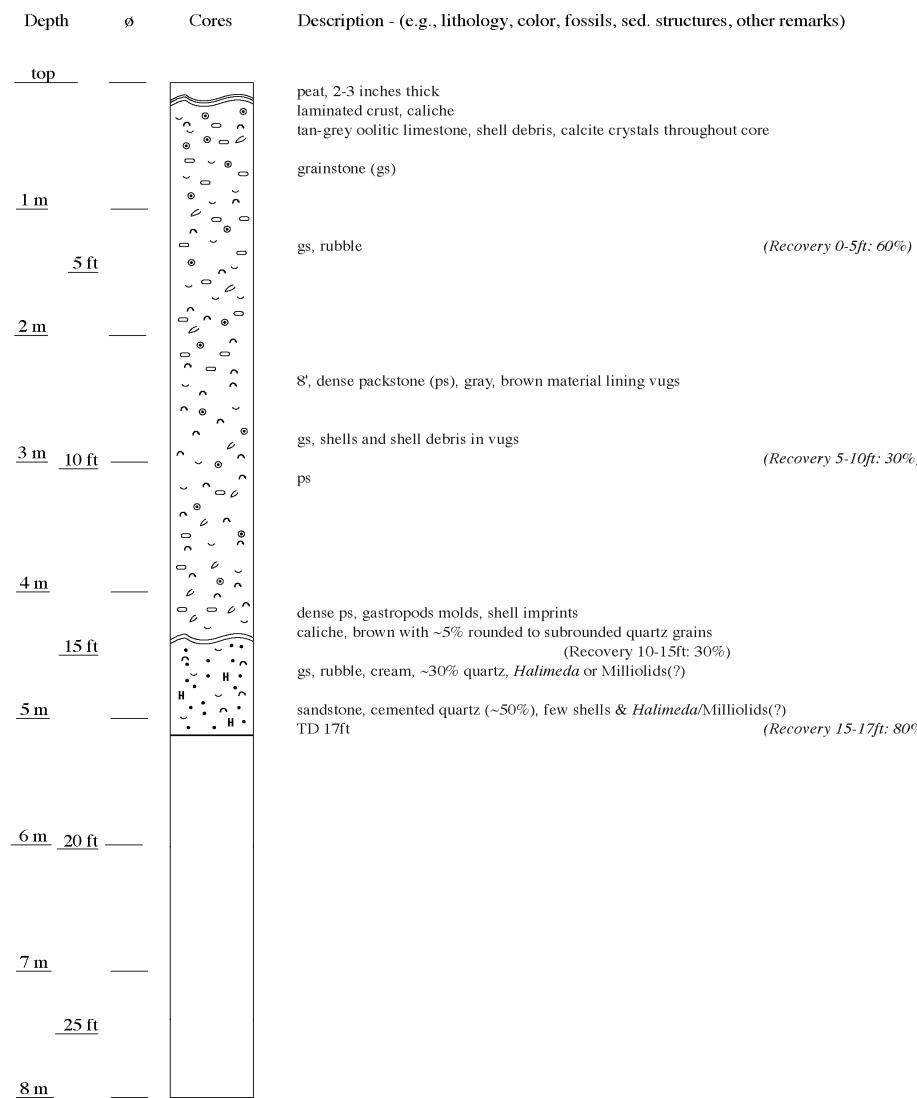
Patterns Used in Well Logs and Their Corresponding Lithologies



0 in heading of core description denotes porosity (decimal units)

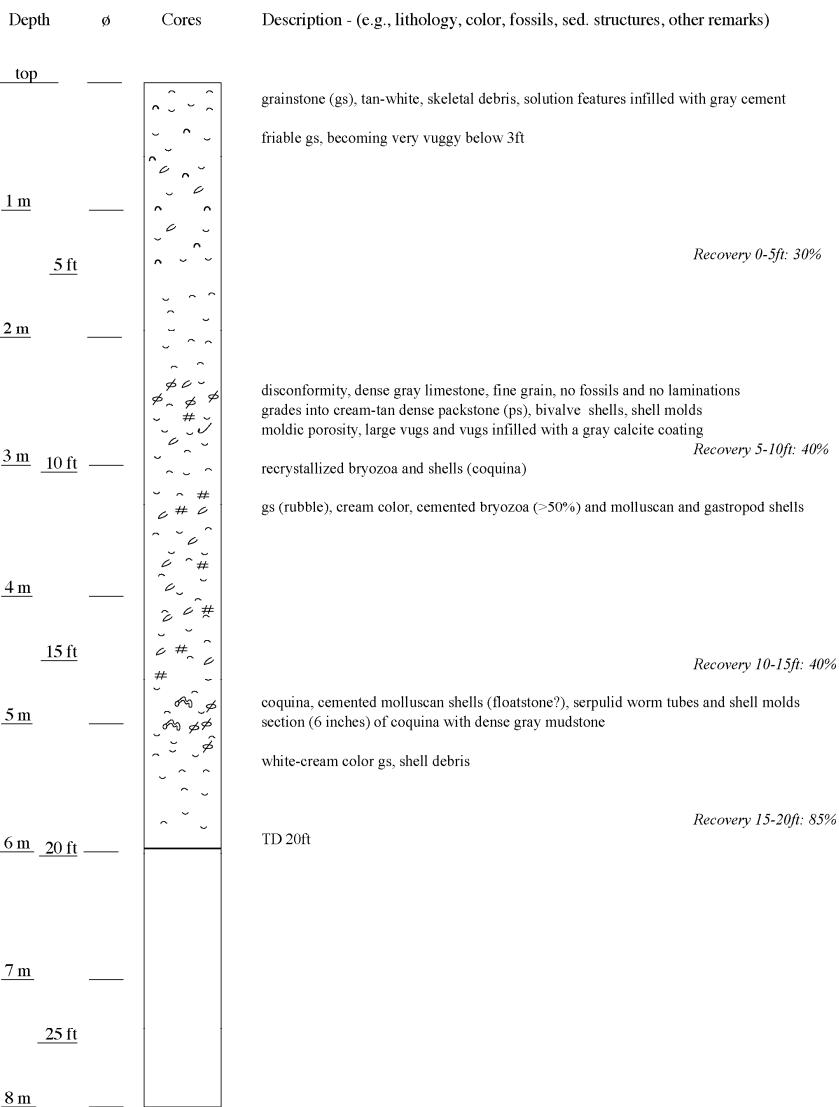
WELL LOG

FORM NO.:	PROJECT NO.:	
PRINCIPLE INVESTIGATOR: R.B. Halley		
COMPANY: U.S. GEOLOGICAL SURVEY		LOCATION: PLACE - Black Point Inshore DATE BEGAN - June 2, 2002 DATE FINISHED - June 2, 2002 GPS : LAT. - 25 31.551' LONG. - -80 19.825'
TOTAL DEPTH: 17 ft ELEVATION (WATER DEPTH): -1 ft		
DRILLING SYSTEM: NQ2 WIRELINE SYSTEM, HYDRAULIC ROTARY DRILL		REMARKS: Located ~100 yards off mangrove shoreline south of Black Point Landfill.
LOGGED BY: Christopher Reich DATE: July 12, 2002 PLOTTED BY: Christopher Reich DATE: July 15, 2001		



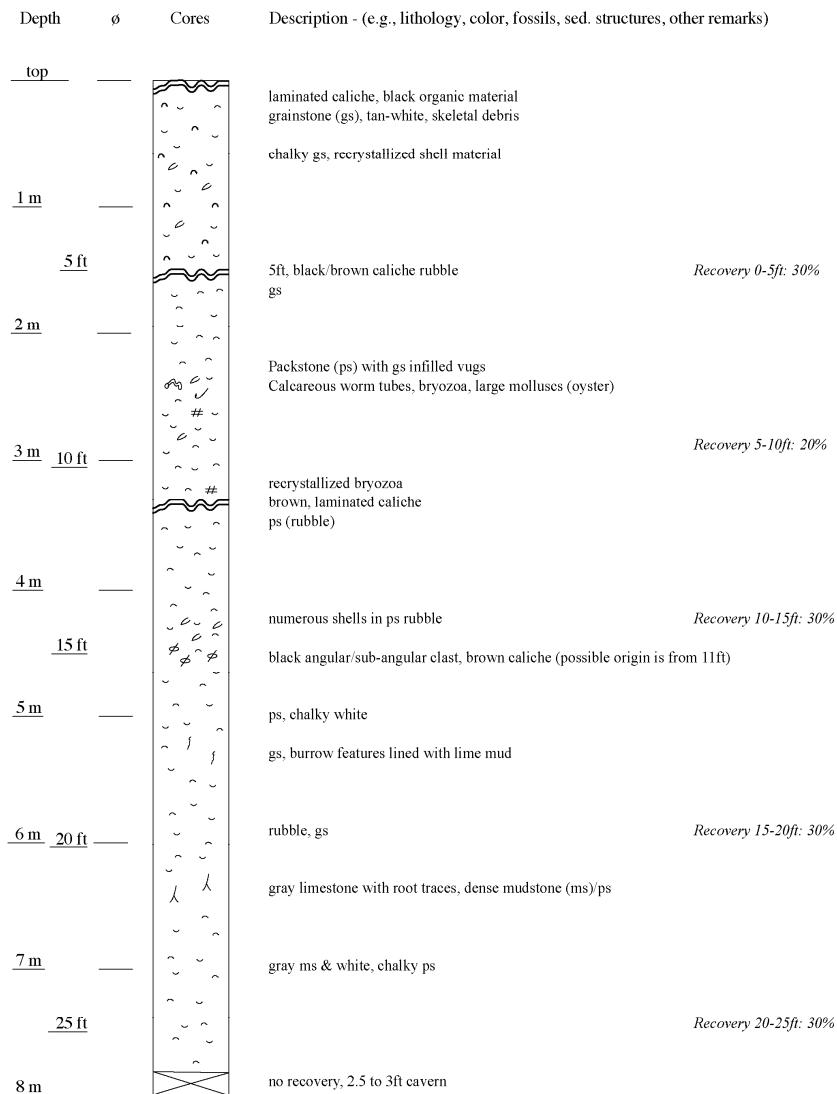
WELL LOG

FORM NO.:	PROJECT NO.:
PRINCIPLE INVESTIGATOR: E.A. Shinn	
COMPANY: U.S. GEOLOGICAL SURVEY	
LOCATION: PLACE - Black Point-1A DATE BEGAN - May 10, 1996 DATE FINISHED - May 10, 1996 GPS : LAT. - 25 31.572' LONG. - -80 19.457'	
TOTAL DEPTH: 20 ft ELEVATION (WATER DEPTH): -2 ft	
DRILLING SYSTEM: NQ2 WIRELINE SYSTEM, HYDRAULIC ROTARY DRILL	
LOGGED BY: Christopher Reich DATE: March 22, 2002 PLOTTED BY: Christopher Reich DATE: March 22, 2001	
REMARKS: Located offshore of Black Point Landfill and south of canal/channel. This core was taken for a previous project.	



WELL LOG

FORM NO.:	PROJECT NO.: 9472-32032
PRINCIPLE INVESTIGATOR: R.B. Halley	TITLE: Subsurface pathways for pollutant transport: Biscayne Bay
COMPANY: U.S. GEOLOGICAL SURVEY	LOCATION: PLACE - Mid-Bay 1A DATE BEGAN - June 9, 2001 DATE FINISHED - June 10, 2001 GPS : LAT. - 25.4838 LONG. - -80.2668
TOTAL DEPTH: 45 ft ELEVATION (WATER DEPTH): -8 ft	
DRILLING SYSTEM: NQ2 WIRELINE SYSTEM, HYDRAULIC ROTARY DRILL	REMARKS: Monitoring well installed, used 2-inch pvc with 5-ft well screen. Depth to base of screen is 33' 2"
LOGGED BY: Christopher Reich DATE: July 3, 2001 PLOTTED BY: Christopher Reich DATE: July 6, 2001	

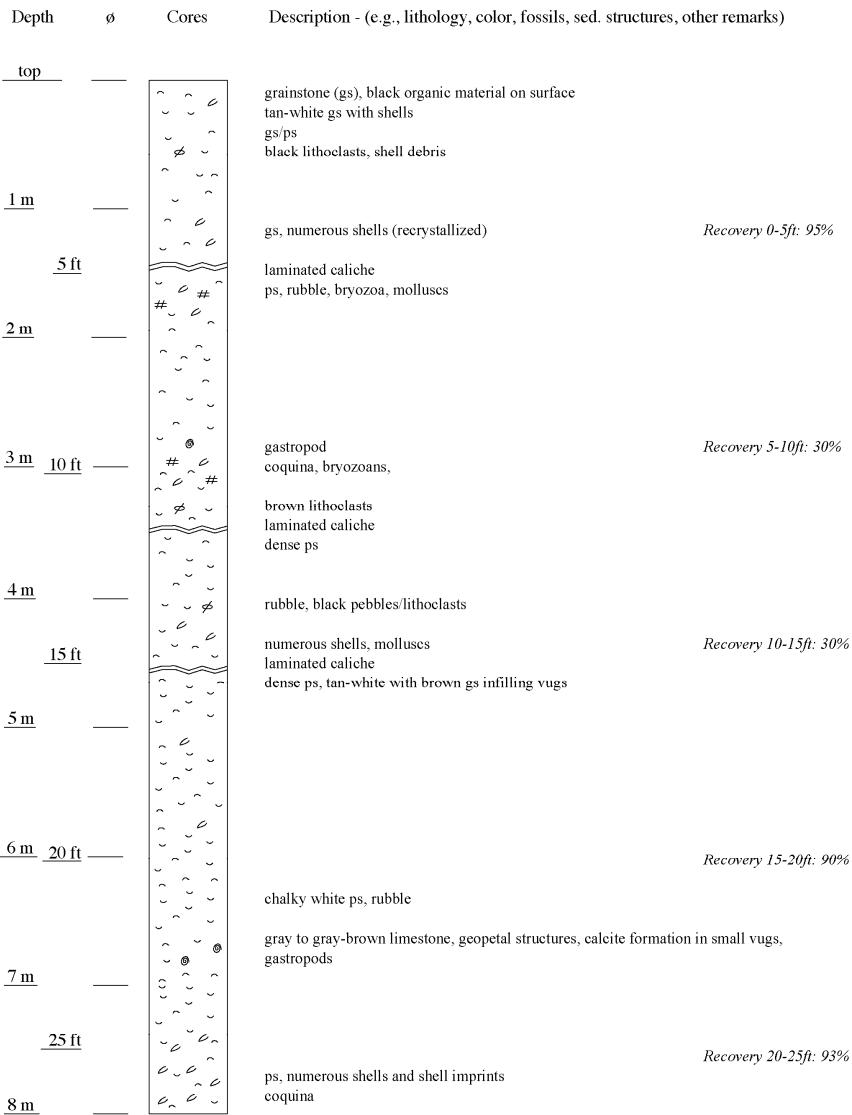


Mid-Bay 1A

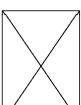
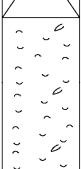
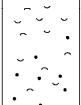
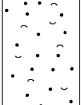
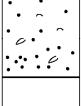
Depth	∅	Cores	Description - (e.g., lithology, color, fossils, sed. structures, other remarks)
<u>8 m</u>	—		no recovery
<u>9 m</u> <u>30 ft</u>	—		ps, gray-brown, small dissolution features coquina dense brown ms, small phosphate sand grains <i>Recovery 25-30ft: 5%</i>
<u>10 m</u> <u>35 ft</u>	—		brown-white ms <i>Recovery 30-35ft: 20%</i>
<u>11 m</u>	—		rubble, ms
<u>12 m</u> <u>40 ft</u>	—		coquina piece <i>Recovery 35-40ft: <5%</i>
<u>13 m</u>	—		dense ms, micro tubules (root structure)
<u>14 m</u>	—		brown ms/ps, shell debris TD 45ft <i>Recovery 40-45ft: <5%</i>
<u>15 m</u> <u>50 ft</u>	—		
<u>16 m</u>	—		
<u>17 m</u>	—		
<u>18 m</u> <u>60 ft</u>	—		
<u>19 m</u>	—		

WELL LOG

FORM NO.:	PROJECT NO.: 9472-32032	
PRINCIPLE INVESTIGATOR: R.B. Halley	TITLE: Subsurface pathways for pollutant transport: Biscayne Bay	
COMPANY: U.S. GEOLOGICAL SURVEY	LOCATION: PLACE - Mid-Bay 1B DATE BEGAN - June 11, 2001 DATE FINISHED - June 12, 2001 GPS : LAT. - 25.4838 LONG. - -80.2668	
TOTAL DEPTH: 55 ft ELEVATION (WATER DEPTH): -8 ft		
DRILLING SYSTEM: NQ2 WIRELINE SYSTEM, HYDRAULIC ROTARY DRILL	REMARKS: Monitoring well installed, used 2-inch pvc with 5-ft well screen. Depth to base of screen is 41' 8"	
LOGGED BY: Christopher Reich PLOTTED BY: Christopher Reich	DATE: July 3, 2001 DATE: July 17, 2001	

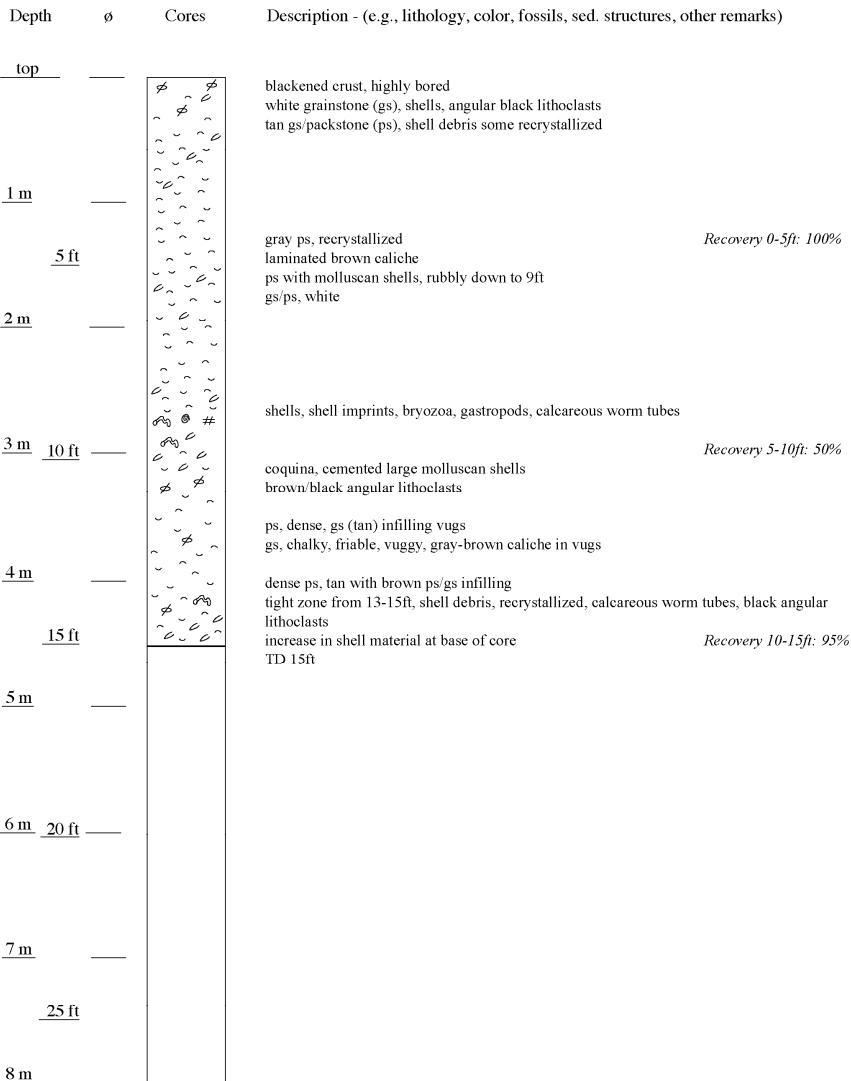


Mid-Bay 1B

Depth	ø	Cores	Description - (e.g., lithology, color, fossils, sed. structures, other remarks)
<u>8 m</u>	—		
<u>9 m</u> <u>30 ft</u>	—		dense brown ms, shell debris is recrystallized <i>Recovery 25-30ft: <5%</i>
<u>10 m</u>	—		
<u>11 m</u>	—		slightly more chalky, mottled brown-white ps/ms burrow structures, very small gs, white chalky with brown ps in vugs
<u>12 m</u> <u>40 ft</u>	—		equina, cemented shell material, friable, rubbly, bryozoa <i>Recovery 35-40ft: 60%</i>
<u>13 m</u>	—		gray ps, white gs infilling, root structures <i>Recovery 40-45ft: 30%</i>
<u>14 m</u>	—		ps, brown to tan, quartz grains (>40%)
<u>15 m</u> <u>50 ft</u>	—		calcareous worm tubes rubble <i>Recovery 45-50ft: <5%</i>
<u>16 m</u>	—		>80% cemented quartz quartz sand, unconsolidated with molluscan fragments TD 55ft <i>Recovery 50-55ft: <5%</i>
<u>17 m</u>	—		
<u>18 m</u> <u>60 ft</u>	—		
<u>19 m</u>	—		

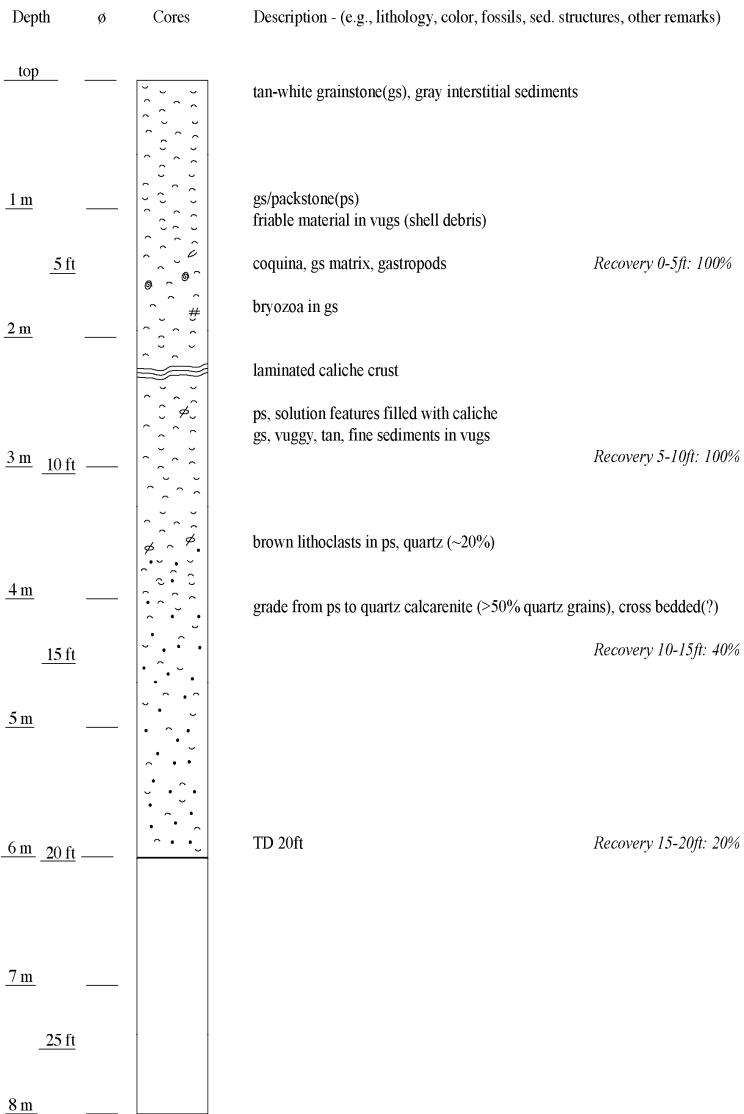
WELL LOG

FORM NO.:	PROJECT NO.: 9472-32032	
PRINCIPLE INVESTIGATOR: R.B. Halley		
COMPANY: U.S. GEOLOGICAL SURVEY		LOCATION: PLACE - Mid-Bay 1C DATE BEGAN - June 13, 2001 DATE FINISHED - June 13, 2001 GPS : LAT. - 25.4838 LONG. - -80.2668
TOTAL DEPTH: 15 ft ELEVATION (WATER DEPTH): -8 ft		
DRILLING SYSTEM: NQ2 WIRELINE SYSTEM, HYDRAULIC ROTARY DRILL		REMARKS: Monitoring well installed, used 2-inch pvc with 5-ft well screen. Depth to base of screen is 15'
LOGGED BY: Christopher Reich DATE: July 2, 2001 PLOTTED BY: Christopher Reich DATE: July 17, 2001		



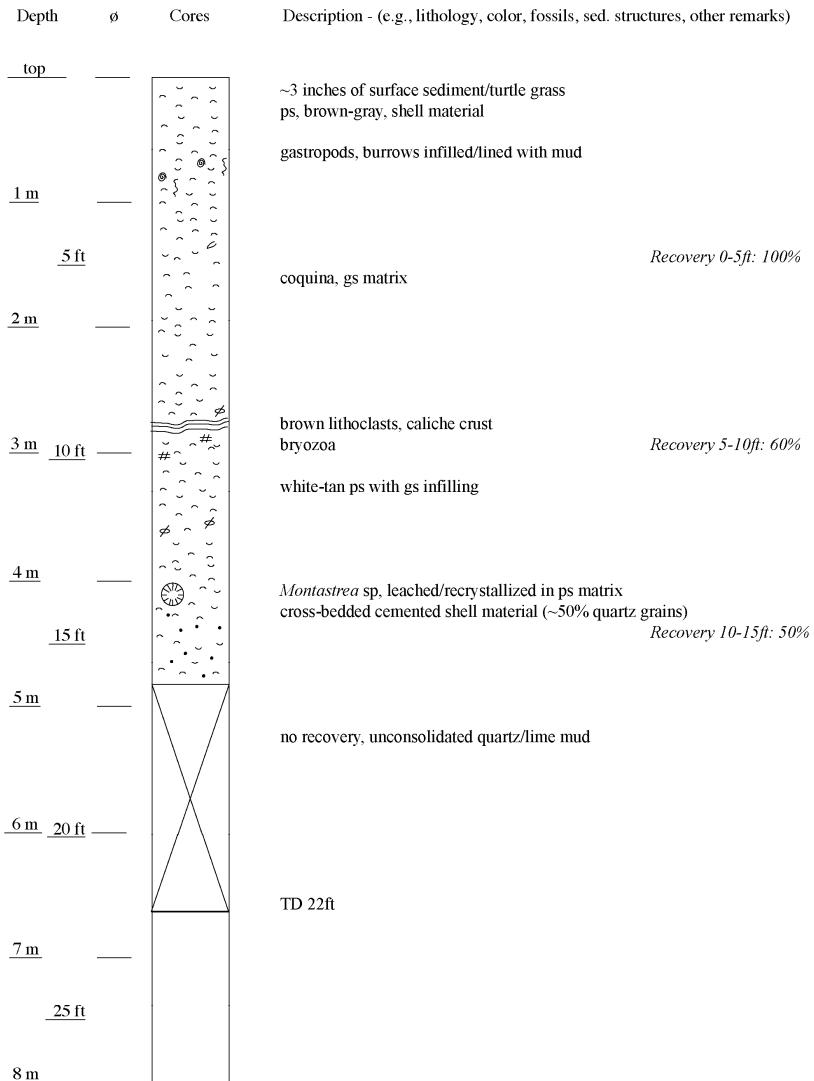
WELL LOG

FORM NO.:	PROJECT NO.: 9472-32032
PRINCIPLE INVESTIGATOR: R.B. Halley	
COMPANY: U.S. GEOLOGICAL SURVEY	LOCATION: PLACE - Billy's Point 1A DATE BEGAN - June 6, 2001 DATE FINISHED - June 7, 2001 GPS : LAT. - 25.4279 LONG. - -80.2124
TOTAL DEPTH: 20 ft ELEVATION (WATER DEPTH): -2 ft	
DRILLING SYSTEM: NQ2 WIRELINE SYSTEM, HYDRAULIC ROTARY DRILL	REMARKS: Monitoring well installed, used 2-inch pvc with 5-ft well screen. Most offshore well. Depth to base of screen is 21' 6"
LOGGED BY: Christopher Reich DATE: July 2, 2001 PLOTTED BY: Christopher Reich DATE: July 6, 2001	



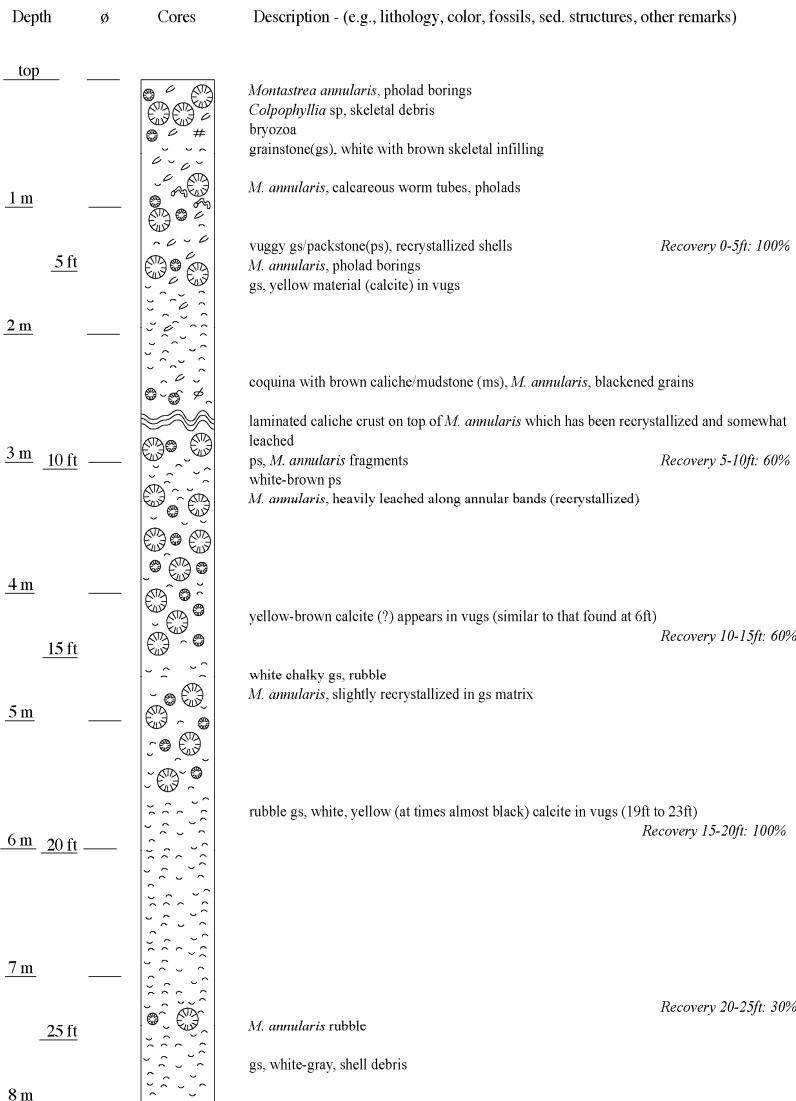
WELL LOG

FORM NO.:	PROJECT NO.: 9472-32032	
PRINCIPLE INVESTIGATOR: R.B. Halley	TITLE: Subsurface pathways for pollutant transport: Biscayne Bay	
COMPANY: U.S. GEOLOGICAL SURVEY	LOCATION: PLACE - Billy's Point 1B DATE BEGAN - June 8, 2001 DATE FINISHED - June 9, 2001 GPS : LAT. - 25.4279 LONG. - -80.2124	
TOTAL DEPTH: 22 ft ELEVATION (WATER DEPTH): -2 ft		
DRILLING SYSTEM: NQ2 WIRELINE SYSTEM, HYDRAULIC ROTARY DRILL	REMARKS: Monitoring well installed, used 2-inch pvc with 5-ft well screen. Most offshore well. Depth to base of screen is ~6'	
LOGGED BY: Christopher Reich PLOTTED BY: Christopher Reich	DATE: July 2, 2001 DATE: July 18, 2001	



WELL LOG

FORM NO.:	PROJECT NO.: 9472-32032	
PRINCIPLE INVESTIGATOR: R.B. Halley	TITLE: Subsurface pathways for pollutant transport: Biscayne Bay	
COMPANY: U.S. GEOLOGICAL SURVEY	LOCATION: PLACE - Petrel Point 1A DATE BEGAN - June 5, 2001 DATE FINISHED - June 6, 2001 GPS : LAT. - 25.415 LONG. - -80.2036	
TOTAL DEPTH: 45 ft ELEVATION (WATER DEPTH): -2 ft		
DRILLING SYSTEM: NQ2 WIRELINE SYSTEM, HYDRAULIC ROTARY DRILL	REMARKS: Monitoring well installed, used 2-inch pvc with 5-ft well screen. Depth to base of screen is 42'	
LOGGED BY: Christopher Reich PLOTTED BY: Christopher Reich	DATE: June 29, 2001 DATE: July 18, 2001	

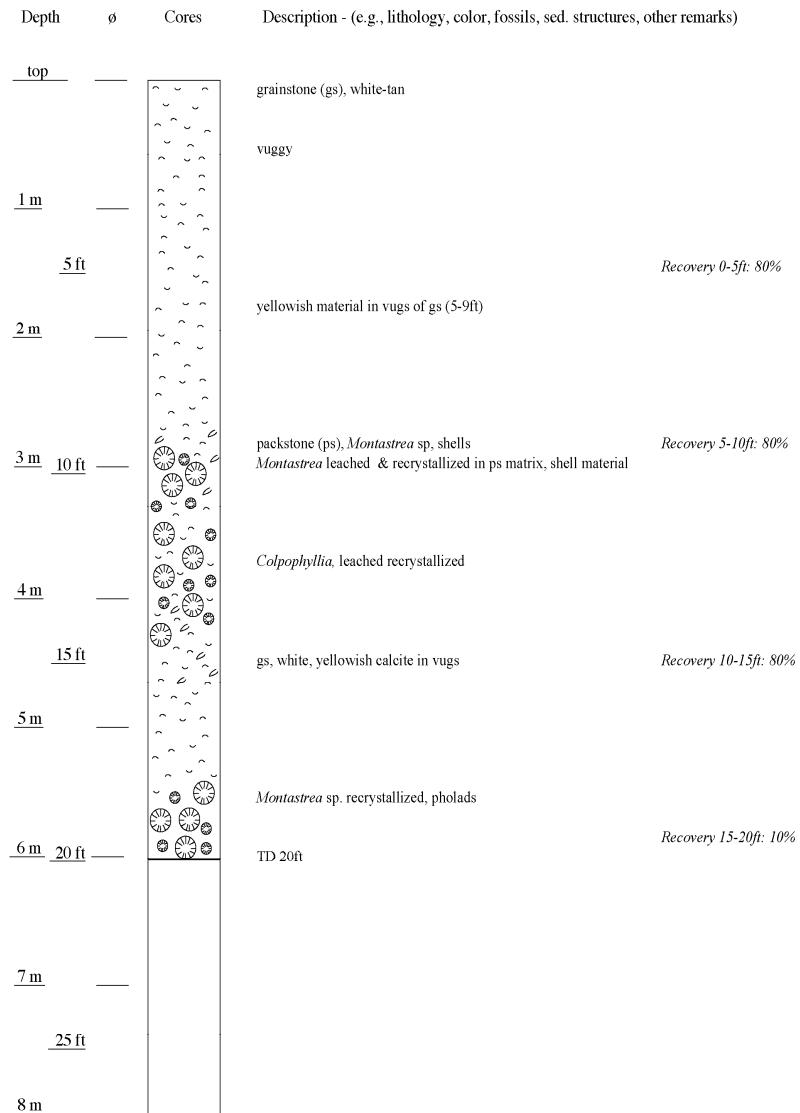


Petrel Point 1A

Depth	Ø	Cores	Description - (e.g., lithology, color, fossils, sed. structures, other remarks)
<u>8 m</u>	—		<i>M. annularis</i> , recrystallized
<u>9 m</u> <u>30 ft</u>	—		gs <i>M. annularis</i> , slightly recrystallized/leached, pholad borings filled with gs
<u>10 m</u>	—		molluscan shell (<i>Spondylus</i>) in gs, shells recrystallized
<u>11 m</u>	—		<i>M. cavernosa</i> , leached/recrystallized coquina <i>Colpophyllia</i> sp <i>M. annularis</i> , pholads infilled with lime mud
<u>12 m</u> <u>40 ft</u>	—		Diploria sp, rubble ps, white-gray, 40% quartz grains ps, gray, coquina deposit, all shells leached, imprints and secondary porosity possible unconformity-brown caliche with >40% quartz in ps matrix
<u>13 m</u>	—		coquina (>80% shells, cemented with quartz some of which are black) TD 45ft
<u>14 m</u>	—		
<u>15 m</u> <u>50 ft</u>	—		
<u>16 m</u>	—		
<u>17 m</u>	—		
<u>18 m</u> <u>60 ft</u>	—		
<u>19 m</u>	—		

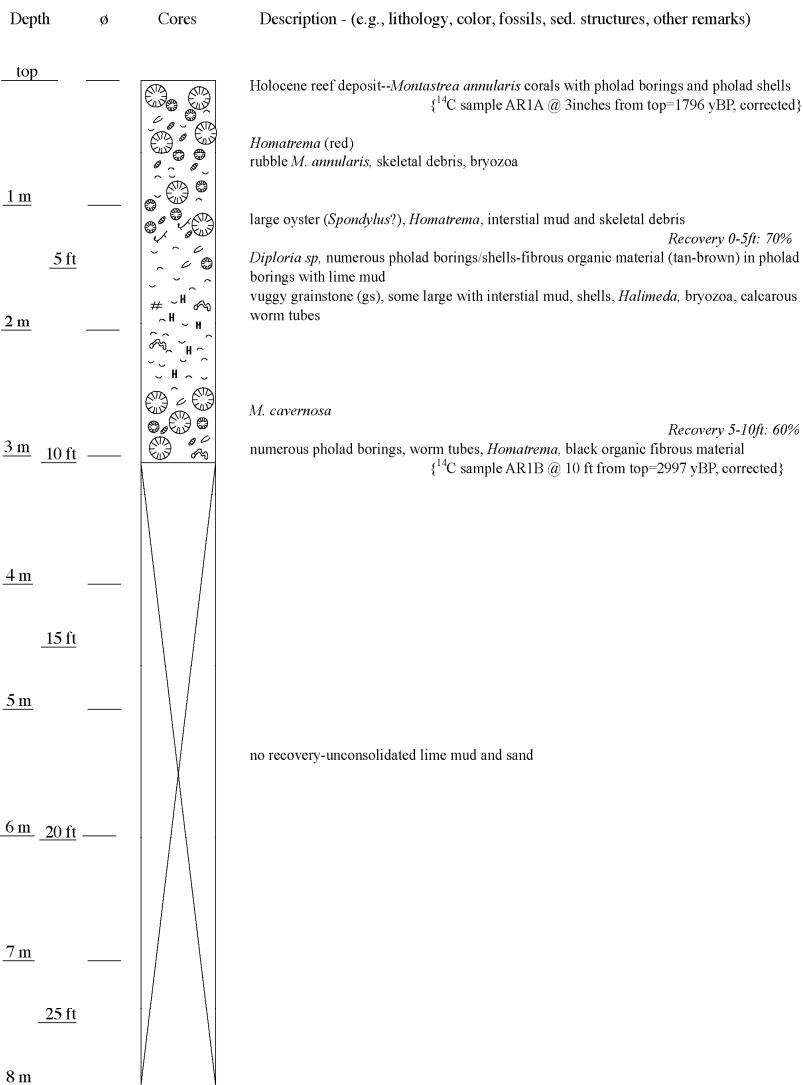
WELL LOG

FORM NO.:	PROJECT NO.: 9472-32032	
PRINCIPLE INVESTIGATOR: R.B. Halley		TITLE: Subsurface pathways for pollutant transport: Biscayne Bay
COMPANY: U.S. GEOLOGICAL SURVEY		LOCATION: PLACE - Petrel Point 1B DATE BEGAN - June 6, 2001 DATE FINISHED - June 6, 2001 GPS : LAT. - 25.415 LONG. - -80.2036
TOTAL DEPTH: 20 ft ELEVATION (WATER DEPTH): -2 ft		
DRILLING SYSTEM: NQ2 WIRELINE SYSTEM, HYDRAULIC ROTARY DRILL		REMARKS: Monitoring well installed, used 2-inch pvc with 5-ft well screen. Depth to base of screen is 20' 6"
LOGGED BY: Christopher Reich DATE: June 29, 2001 PLOTTED BY: Christopher Reich DATE: July 18, 2001		



WELL LOG

FORM NO.:	PROJECT NO.: 9472-32032	
PRINCIPLE INVESTIGATOR: R.B. Halley		
COMPANY: U.S. GEOLOGICAL SURVEY		LOCATION: PLACE - Alina's Reef 1A DATE BEGAN - June 14, 2001 DATE FINISHED - June 15, 2001 GPS : LAT. - 25.3862 LONG. - -80.1629
TOTAL DEPTH: 60 ft ELEVATION (WATER DEPTH): -9 ft		
DRILLING SYSTEM: NQ2 WIRELINE SYSTEM, HYDRAULIC ROTARY DRILL		REMARKS: Monitoring wells installed, used 1-inch pvc with 5-ft well screen. Multi-depth nested well site. Well A is taller (60ft) than Well B (32ft).
LOGGED BY: Christopher Reich DATE: June 29, 2001 PLOTTED BY: Christopher Reich DATE: July 19, 2001		

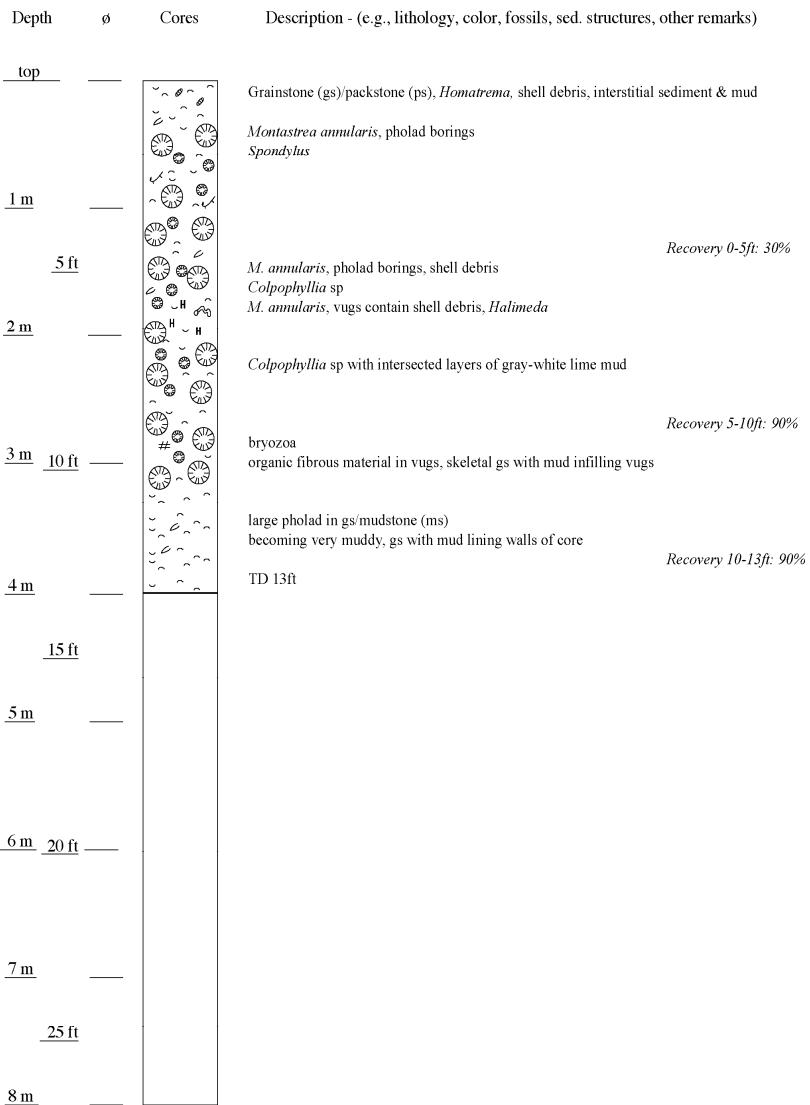


Alina's Reef 1A/B

Depth	∅	Cores	Description - (e.g., lithology, color, fossils, sed. structures, other remarks)
<u>8 m</u>	—		no recovery
<u>9 m</u> <u>30 ft</u>	—		
<u>10 m</u>	—		tan mudstone (ms), chalky, caliche lithoclasts (some blackened/angular), quartz sand (<10%) brown caliche, root traces, dessication cracks (?)
<u>35 ft</u>			shell material/debris <i>Recovery 30-35ft: 40%</i>
<u>11 m</u>	—		ms rubble
<u>12 m</u> <u>40 ft</u>	—		grading into chalky packstone (ps) with lime mud in vugs <i>Recovery 35-45ft: <5%</i>
<u>13 m</u>	—		<i>Recovery 45-50ft: <5%</i>
<u>45 ft</u>			
<u>14 m</u>	—		
<u>15 m</u> <u>50 ft</u>	—		<i>Recovery 45-50ft: <5%</i>
<u>55 ft</u>			
<u>16 m</u>	—		
<u>55 ft</u>			
<u>17 m</u>	—		
<u>18 m</u> <u>60 ft</u>	—		<i>Recovery 55-60ft: <5%</i>
<u>19 m</u>	—		

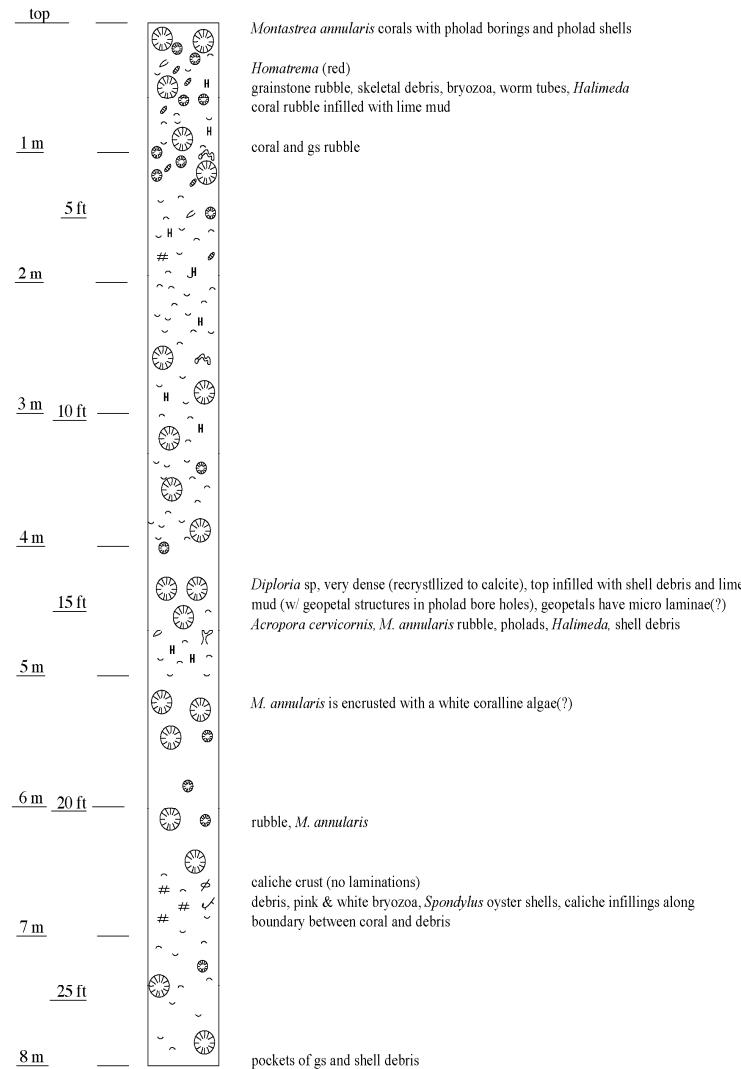
WELL LOG

FORM NO.:	PROJECT NO.: 9472-32032	
PRINCIPLE INVESTIGATOR: R.B. Halley		
COMPANY: U.S. GEOLOGICAL SURVEY		LOCATION: PLACE - Alina's Reef 1C DATE BEGAN - June 16, 2001 DATE FINISHED - June 16, 2001 GPS : LAT. - 25.3862 LONG. - -80.1629
TOTAL DEPTH: 13 ft ELEVATION (WATER DEPTH): -9 ft		
DRILLING SYSTEM: NQ2 WIRELINE SYSTEM, HYDRAULIC ROTARY DRILL		REMARKS: Monitoring well installed, used 1-inch pvc with 5-ft well screen. Well site is ~20ft SE of Alina's Reef 1A well nest. Screen set at ~12ft below subsurface.
LOGGED BY: Christopher Reich DATE: June 28, 2001 PLOTTED BY: Christopher Reich DATE: July 18, 2001		



WELL LOG	
FORM NO.:	PROJECT NO.: 9472-32032
PRINCIPLE INVESTIGATOR: R.B. Halley	TITLE: Subsurface pathways for pollutant transport: Biscayne Bay
COMPANY: U.S. GEOLOGICAL SURVEY	LOCATION: PLACE - Pacific Reef DATE BEGAN - May 30, 2002 DATE FINISHED - June 1, 2002 GPS : LAT. - 25° 22.241 LONG. - -80° 08.539
TOTAL DEPTH: 42 ft ELEVATION (WATER DEPTH): -12'	
DRILLING SYSTEM: NQ2 WIRELINE SYSTEM, HYDRAULIC ROTARY DRILL	REMARKS: Well site located ~50 yards south of structure at Pacific Reef. Two 1-inch-diameter wells in same borehole.
LOGGED BY: Christopher Reich DATE: July 12, 2002 PLOTTED BY: Christopher Reich DATE: July 15, 2002	

Depth ϕ Cores Description - (e.g., lithology, color, fossils, sed. structures, other remarks)



Pacific Reef

Depth	ø	Cores	Description - (e.g., lithology, color, fossils, sed. structures, other remarks)
<u>8 m</u>	—		chalky and friable gs in coral vugs <i>Diploria</i> sp infilled with gs and lime mud, bryozoa and shell debris in vugs
<u>9 m</u> <u>30 ft</u>	—		<i>A. cervicornis</i>
<u>10 m</u>	—		<i>M. annularis</i> , growth interrupted by ps (lime mud) within a 1-ft section caliche crust
<u>11 m</u>	—		gs, bryozoa <i>M. annularis</i>
<u>12 m</u> <u>40 ft</u>	—		rubbly white ps, coral pieces white encrusting coralline algae(?) <i>M. annularis</i> TD 42ft
<u>13 m</u>	—		
<u>14 m</u>	—		
<u>15 m</u> <u>50 ft</u>	—		
<u>16 m</u>	—		
<u>17 m</u>	—		
<u>18 m</u> <u>60 ft</u>	—		
<u>19 m</u>	—		



As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

BISC D-289